

Sockets Assignment 5 Report

Instruction:

Sockets 5: Extend your chatbot server so that it can handle multiple simultaneous conversations at once by spawning a new thread for every client. (est 3 hours)

Explanation:

As this lab's instruction says, what we need to accomplish for this lab is to make multithreading for a chatbot.

On the client-side, there was no significant change regards the program itself. I only added the print statement on line 5 to show which socket the client is communicating with the server.

On the server-side, the multithreaded functionality was added. Since a new thread has to be created, I introduced a method called “start_new_thread,” which receives two arguments. The first argument will receive the function's name, and the second argument is the parameter for the function for the first parameter. The function ‘conv,’ which is passed as the first parameter of the start_new_thread function, contains the original chatbot server-side code, which handles the response and receives answers from the client-side. Every new connection (new thread) will run the while loop on line 55, and the counter (t_num) will increment by one. The print statement will show which socket is handling the communication with the client-side. The function start_new_thread will returns immediately, and the child thread will start by calling the first argument with the second argument as the parameters. When the function returns, the thread is terminated.

Code:

Client:

```
1.  #!/usr/bin/env python3
2.  from socket import *
3.  s = socket(AF_INET, SOCK_STREAM)
4.  s.connect(("127.0.0.1", 7069))
5.  print("Connected to the server.\n\thandling communication with", s.getsockname())
6.  while 1:
7.      data = s.recv(10000)
8.      print(data.decode())
9.      message = input("Client:\t")
10.     s.send(message.encode())
11.     if message == "e":
12.         print("Exiting...")
```

```
13.     s.close()
14.     break
15. s.close()
```

Server:

```
1.  #!/usr/bin/env python3
2.  from socket import *
3.  import _thread
4.
5.  def conv(c, a):
6.      counter = 0
7.      while True:
8.          if counter == 0:
9.              c.send("System:\tHello, welcome to chatbot program. \nSystem:\tAre you importing messages from
              file? \nSystem:\tEnter only either \"yes\" or \"no\".".encode())
10.             counter += 1
11.             elif counter == 1:
12.                 if data == "yes":
13.                     c.send("System:\tIimport file but currently not available. \nSystem:\tHello, are you male or
                     female?".encode())
14.                     counter += 1
15.                 elif data == "no":
16.                     c.send("System:\tHello, are you male or female?".encode())
17.                     counter += 1
18.                 else:
19.                     c.send("System:\tPlease enter in the correct format ... \n".encode())
20.             elif counter == 2:
21.                 if data == "female":
22.                     c.send("System:\tHow excellent! \nSystem:\tAre you a CS major?".encode())
23.                 elif data == "male":
24.                     c.send("System:\tMe too. \nSystem:\tAre you CS major?".encode())
25.                 else:
26.                     c.send("System:\tGreat! \nSystem:\tAnyways, are you CS major?".encode())
27.                 counter += 1
28.             elif counter == 3:
29.                 if data == "no":
```

```
30.         c.send("System:\tToo bad. \nSystem:\tAnyway, what's an animal you like, and two you
don't?".encode())
31.         elif data == "yes":
32.             c.send("System:\tExcellent, I am too. \nSystem:\tWhat's an animal you don't like, and two you
don't?".encode())
33.         else:
34.             c.send("System:\tCool! \nSystem:\tBy the way, what's an animal you like, and two you
don't?".encode())
35.             counter += 1
36.         elif counter == 4:
37.             data1 = data.split(',')
38.             msg = "System:\t%s awesome, but i hate %s too. \nSystem:\tBye for now. \n***Enter 'e' to exit
program." % (data1[0].strip(), data1[-1].strip())
39.             c.send(msg.encode())
40.             counter += 1
41.         else:
42.             c.send("").encode())
43.             data = c.recv(1000).decode().strip()
44.             if data == "e":
45.                 print("Exiting...")
46.                 c.send("e".encode())
47.                 c.close()
48.                 break
49.             c.close()
50.
51. s = socket(AF_INET, SOCK_STREAM)
52. s.bind(("127.0.0.1", 7069))
53. s.listen(5)
54. t_num=0
55. while 1:
56.     c,a = s.accept()
57.     _thread.start_new_thread(conv, (c,a))
58.     t_num += 1
59.     print("I am new thread %d\n handling communication with %s" % (t_num, (a,)))
```

Output:

```
Kens-MBP:sockets_assignment5 ken$ python3 server.py
I am new thread 1
  handling communication with ('127.0.0.1', 62221)
I am new thread 2
  handling communication with ('127.0.0.1', 62224)
I am new thread 3
  handling communication with ('127.0.0.1', 62225)
Exiting...
Exiting...
Exiting...
█
```

Server ->

```
Kens-MBP:sockets_assignment5 ken$ python3 client.py
Connected to the server.
  handling communication with ('127.0.0.1', 62221)
System: Hello, welcome to chatbot program.
System: Are you importing messages from file?
System: Enter only either "yes" or "no".
Client: yes
System: Import file but currently not available.
System: Hello, are you male or female?
Client: male
System: Me too.
System: Are you CS major?
Client: yes
System: Excellent, I am too.
System: What's an animal you don't like, and two you don't?
Client: wolf,cat
System: wolf awesome, but i hate cat too.
System: Bye for now.
***Enter 'e' to exit program.
Client: e
Exiting...
Kens-MBP:sockets_assignment5 ken$ █
```

Client1 ->

```
Kens-MBP:sockets_assignment5 ken$ python3 client.py
Connected to the server.
  handling communication with ('127.0.0.1', 62224)
System: Hello, welcome to chatbot program.
System: Are you importing messages from file?
System: Enter only either "yes" or "no".
Client: no
System: Hello, are you male or female?
Client: male
System: Me too.
System: Are you CS major?
Client: no
System: Too bad.
System: Anyway, what's an animal you like, and two you don't?
Client: bear,dog
System: bear awesome, but i hate dog too.
System: Bye for now.
***Enter 'e' to exit program.
Client: e
Exiting...
Kens-MBP:sockets_assignment5 ken$ █
```

Client2 ->

Client3 ->

```
Kens-MBP:sockets_assignment5 ken$ python3 client.py
Connected to the server.
    handling communication with ('127.0.0.1', 62225)
System: Hello, welcome to chatbot program.
System: Are you importing messages from file?
System: Enter only either "yes" or "no".
Client: no
System: Hello, are you male or female?
Client: male
System: Me too.
System: Are you CS major?
Client: no
System: Too bad.
System: Anyway, what's an animal you like, and two you don't?
Client: dog,cat
System: dog awesome, but i hate cat too.
System: Bye for now.
***Enter 'e' to exit program.
Client: e
Exiting...
```